SYSTEMS ENGINEERING
Research Center

Army Systems Engineering Career Development Model

Technical Report SERC-2015-TR-042-3

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14. ABSTRACT
The Army Improved Systems Engineering (SE) Career Development System (CDS) report begins with a description of the evolution of the baseline CDS, composed of: a) an assumed input of Army Engineering Career Field individuals whose careers are then developed through the five major elements of education, experience, tenure, currency, and cross-functional competencies integrated by career management and mentorship; and b) an objective output of a future pool of engineering Key Leadership Position (KLP) candidates. Research objectives focused on expanding the CDS elements of Education and Experience, Tenure and Cross-Functional Competencies, Mentorship, and Continuing Learning Modules (CLM). Discovery activities are then illustrated and followed by research findings described in terms of strengths, limitations, observations and recommendations for each subtask. The report concludes with summary observations resulting from a holistic perspective of the four subtasks and three major career development recommendations. Specifically those recommendations focus on: improving the transition from Engineering Level III-to-KLP, a shift to the use of value propositions as career development objectives as an explicit way of assessing and documenting individual capability demonstrations, and development of an Integrated Professional Development Planning and Measurement tool in the form of a Professional Development Decision Support System.

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ABSTRACT

This report describes the research findings, discussions, and recommendations of SERC Research Task RT-121 that expands on the components of the Army Improved Systems Engineering (SE) Career Development System (CDS) previously developed under SERC RT-1041. The report begins with a description of the evolution of the baseline CDS, composed of: a) an assumed input of Army Engineering Career Field individuals whose careers are then developed through the five major elements of education, experience, tenure, currency, and cross-functional competencies integrated by career management and mentorship; and b) an objective output of a future pool of engineering Key Leadership Position (KLP) candidates. RT-121 research objectives, categorized in four subtasks focused on expanding the CDS elements of Education and Experience, Tenure and Cross-Functional Competencies, Mentorship, and Continuing Learning Modules (CLM), are then described. RT-121 discovery activities, including collaborative meetings with the Army and Army-provided source data, are then illustrated and followed by research findings described in terms of strengths, limitations, observations and recommendations for each subtask. The report concludes with summary observations resulting from a holistic perspective of the four subtasks and three major career development recommendations to be used as points of departure for further consideration. Specifically those recommendations focus on:

- Improving the transition from Engineering Level III-to-KLP,
- A shift to the use of value propositions as career development objectives as an explicit way of assessing and documenting individual capability demonstrations, and,
- Development of an Integrated Professional Development Planning and Measurement tool in the form of a Professional Development Decision Support System.

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[1] *RT-104 SERC A013 – Technical Report SERC-2014-TR-042-1*, March 31, 2014

EXECUTIVE SUMMARY

The Army requires a deliberate, continuous, and progressive SE career development model that provides engineers with the experience, education, and training to effectively support the acquisition community. The model additionally needs to address individual, organizational, and enterprise actions for career development to include a) allowances for fact-of-life changes to allow an individual to tailor their career development, b) organizational elements to address organizational responsibilities for career development, and c) enterprise aspects to link policies and infrastructure changes to support career management at an enterprise level. The ultimate goal of the CDS is to ensure that the Army has the engineering talent to support the acquisition community and to create a cadre of future engineering leaders.

The SERC previously conducted research, provided a recommended approach to develop an Army SE CDS, and submitted the research findings in *RT-104 SERC A013 – Technical Report SERC-2014-TR-042-1*, March 31, 2014. Upon review of the RT-104 final technical report, ASA (ALT) SOSE&I requested the SERC perform additional research to expand on the Education, Experience, Tenure, Currency, and Cross-Functional Competency components of the RT-104 model as well as the Continuous Learning Modules (CLM) currently required for Key Leadership Positions (KLP). The SERC Research Task (RT-121) approach plan expanded upon the RT-104 CDS components and the CLMs through four specific subtasks.

Subtask 1: Education & Experience: Expand on the RT-104 Education and Experience recommendations by recommending a productive link amongst the multiple databases that comprise Army Career Acquisition Management such as the Career Record Brief and Army Career Tracker.

Subtask 2: Tenure & Cross Functional Competencies: Expand on the RT-104 Tenure and Cross Functional recommendations and provide a recommended Personnel Rotational Model.

Subtask 3: Army Mentorship: Expand on the RT-104 Mentorship recommendations and conduct research on how best to incentivize the Army Mentorship Program amongst the Engineering ACF workforce.

Subtask 4: Continuing Learning Modules (CLM): Expand upon FIPT CLM review to prioritize CLMs for KLP development, and provide a recommended CLP catalogue.

As a result of RT-121 research on the four CDS subtasks noted above, the SERC research team recommends that ASA (ALT) SOSE&I a) Consider a cultural shift to the use of value propositions as certification criteria to provide a more explicit way of demonstrating individual capabilities for the career development enterprise, b) Improve engineering certification processes to enhance the continuity of Level III-to-KLP transitions, and c) Expand the career guidance utility of the current career management information system (e.g. CAMP) through the inclusion of a CDS Decision Support System.

BACKGROUND

BASELINE IMPROVED SE CAREER DEVELOPMENT SYSTEM (CDS)

Figures 1 and 2 below depict the evolution of the baseline CDS developed during the RT-104 research phase. Evolution of the baseline CDS began with an initial assessment framework (Figure 1) based on Individual, Organizational, and Enterprise expectations or value propositions of acquisition engineers. Further, the value propositions were viewed as drivers behind the education, training, experience, and mentoring enablers of a career development model for Level III certified engineers to achieve KLP candidacy readiness.
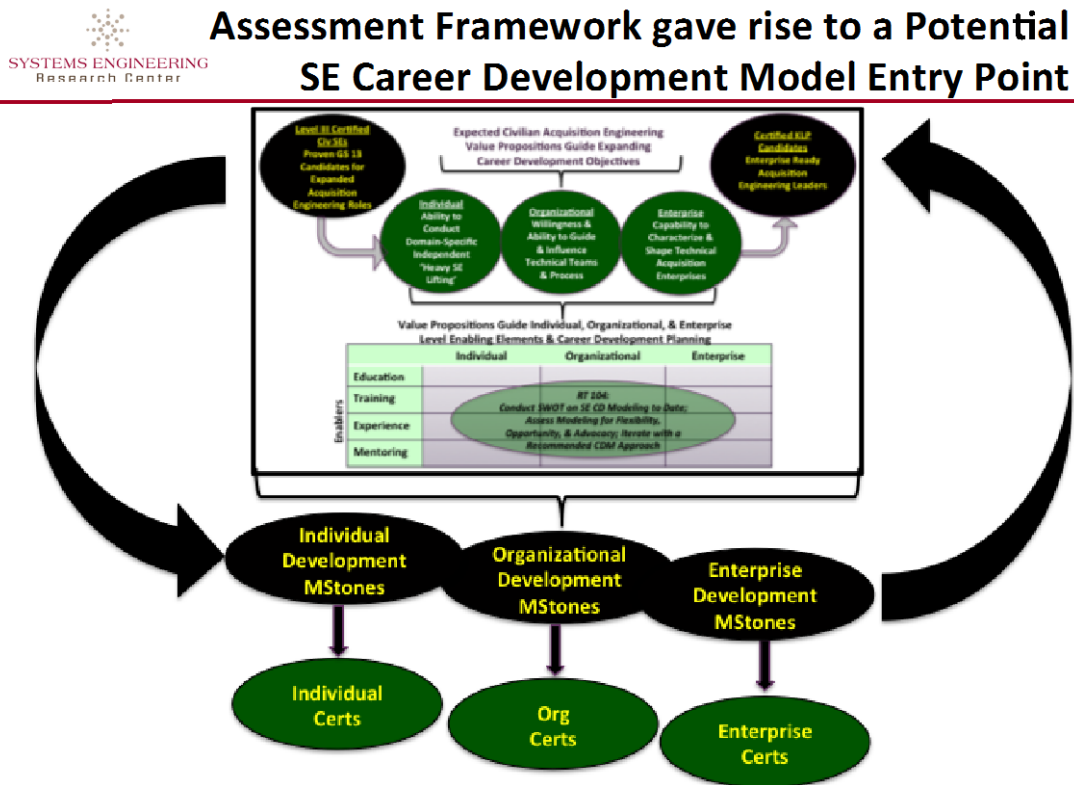
Figure 1: RT 104 Assessment Framework

As a result of continuing collaborations with the ASA (ALT) SOSE&I, the initial assessment framework transitioned to the notion of career development being treated as a system that operates on inputs to provided desired outputs. In addition, career management was added to provide integration guidance and mentorship was shifted in purpose to become an integration element for the functional model elements of education, training, and experience. The result was termed the Improved Army SE Career Development System (IASE-CDS) shown in Figure 2. For clarity, the IASE-CDS is referred to in this report as the CDS.

CDS Further Evolved to Highlight Active Career Management & Mentorship as Overarching Integration Features
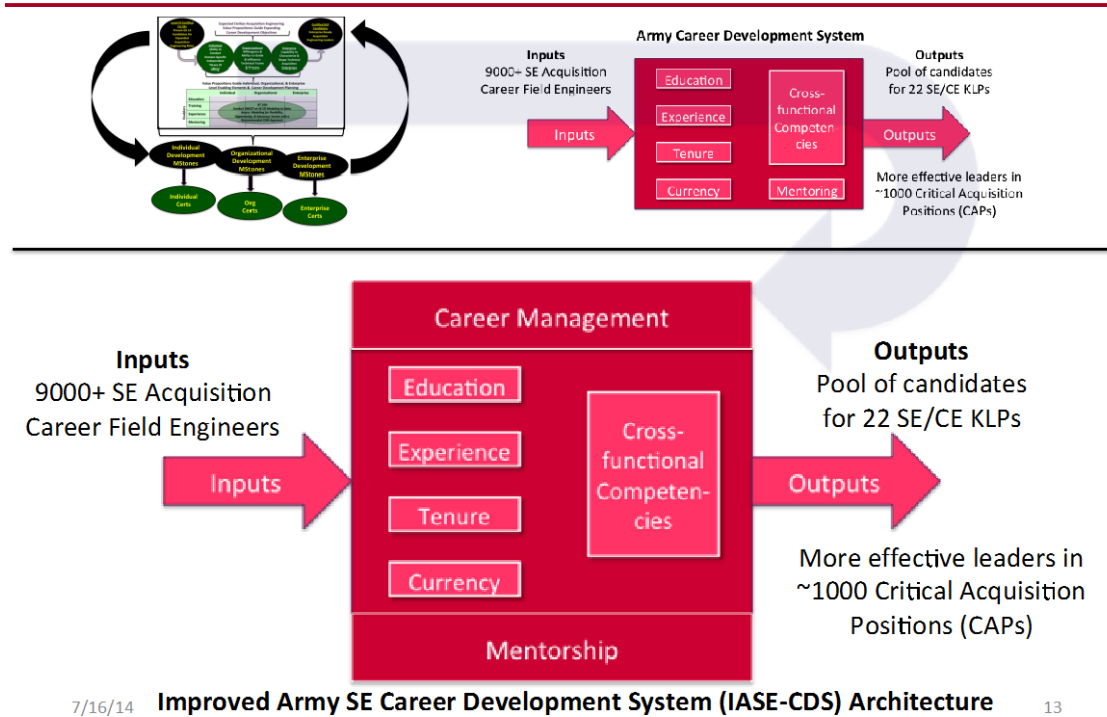
Improved Army SE Career Development System (IASE-CDS) Architecture

Figure 2: Baseline IASE-CDS Architecture

RT-121 Research Roadmap

RT-121 research began with a review of the RT-104 work, descriptions of the RT-121 subtasks, and a list of requirements for subtask discovery and interactions with the Army Defense Acquisition Career Management (DACM) Office. The research plan was reviewed with both ASA (ALT) SOSE&I and DACM representatives in June 2014[2]. Specific discovery needs were presented in the form of subtask questions (Figures 3 - 6) for Army representatives with the intent to set the background for additional ASA (ALT) and DACM discussions in July[3] and August 2014[4]. Analyses of the data from the collaborative discussions were then conducted that supported the research observations and recommendations.

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[2] ASA (ALT) SOSE&I-DACM-SERC Discussions, Ft Belvoir, VA, June 25, 2014
[3] ASA (ALT) SOSE&I-DACM-SERC Discussions, Ft Belvoir, VA, July 16, 2014
[4] ASA (ALT) SOSE&I-DACM-SERC Discussions, Ft Belvoir, VA, August 25, 2014

- ***Subtask 1 - Education & Experience***: Recommend a productive link amongst the multiple databases that comprise Army Career Acquisition Management such as the Career Record Brief and Army Career Tracker

  —Understand DACM's overarching Acquisition Career Management System databases and interrelationships

  - o What are the databases & what do they contain?
  - o How are they maintained? Managed? Linked?
  - o Is the data analyzed and/or measured against mandates and/or planned education and/or experience roadmaps ?
  - o Are there expected/presented responses to the measurements?
  - o Are there education/experience elements within supervisors/leaders performance appraisals?

  —Define the terms and context of a 'Productive Link'

Figure 3: Subtask 1 Questions

- ***Subtask 2 - Tenure & Cross Functional Competencies***: Recommend a Personnel Rotational Model as an expansion on the RT 104 Tenure and Cross Functional recommendations

  —Are there representative sets of desired and/or measureable outcomes of rotational assignment programs?

  —Are there representative sets of KLP qualification requirements, board processes, and/or qualification criteria?

  —How would PEO & KLP requirements differ?

Figure 4: Subtask 2 Questions

- ***Subtask 3 - Army Mentorship***: Recommend how best to incentivize the Army Mentorship Program amongst the Engineering ACF workforce

  —Understand the DACM's mentorship initiatives to assess application to the Engineering ACF workforce

  - o Are there ongoing Formal/Informal mentorship initiatives?
  - o Are there Mentorship 'communities of interest' with a list of mentors?
  - o Has DACM conducted Mentorship focus group sessions? Data available?

Figure 5: Subtask 3 Questions

- ***Subtask 4 - Currency & Continuous Learning Modules***: Prioritize Continuous Learning Modules (CLMs) for KLP development and provide a recommended CLP catalogue

  —Where is the current catalog of FIPT approved CLMs?

  —What are the DACM's thoughts forward vis a vis assessing the CLMs against KLP requirements?

Figure 6: Subtask 4 Questions

RT-121 DASHBOARD AND STATUS

Figure 7 depicts the current RT-121 research roadmap status. Specific status details are provided in the body of this report.

RT121 Dashboard & Status	
Subtask	**Status**
Subtask 1: Education & Experience	
a) Initially Interface with the Army DACM office to understand the overarching Acquisition Career Management System databases and interrelationships	DACM provided an overview brief on the multiple databases that comprise Army Acquisition Career Management such as CAPPMIS. SOSE DACM to set up a follow-on virtual DCO session in order to showcase CAPPMIS.
b) Define the terms and context of a 'Productive Link'	Draft recommendations completed
c) Assess the states of the integral database elements such as the Acquisition Civilian Record Brief (ACRB) and Army Civilian Training (ACT)	Completed based on data and DACM-ASA ALT-SERC telecons of 8/25/14 and 9/18/14.
d) Recommend implementation requirements and development processes to achieve the definition of a 'Productive Link'	Initial draft assessments of the Career Acquisition Management Portal (CAMP) and associated recommendations for improving productivity of career management information network are complete. In addition, initial draft assessments and recommendations for improving validations of demonstrated KLP competencies have been completed. Draft recommendations will be published in the October Interim Report.
Subtask 2: Tenure & Cross Functional Competencies	
a) Develop a recommended set of desired and measurable outcomes of a rotational assignment program using the Cross-Functional Competencies described in the OUSD (AT&L) Memorandum of 8 Nov 2013 "Leadership Positions and Qualification Criteria" as requirement guidelines	*(Open Action Item): DACM / SOSE to provide any recommended contact information for ongoing rotational assignments to discuss possible metrics rotational assignments to discuss possible metrics.* -- Initial draft assessments of the Senior Enterprise Talent Management (SETM) program and associated recommendations for improvements are complete. Draft recommendations will be published in the October Interim Report.
Recommend a CLP portfolio structure that supports the outcomes defined in a) above	In progress
Subtask 3: Army Mentorship	
a) Interface with the DACM office to understand the DACM's mentorship initiatives to assess application to the Engineering ACF workforce	*(Open Action Item): DACM to provide initial feedback on the recent PM Mentoring Program.* -- Initial draft assessments of the Army Mentorship Program and associated recommendations for improvements are complete. Draft recommendations will be published in the October Interim Report.
b) Conduct focus group sessions with engineering ACF mentors and protégés	TBD
Provide recommended non-monetary incentive strategies that serve to increase the Mentoring program value amongst the engineering ACF workforce	In progress.
Subtask 4: Continuing Learning Modules (CLM)	
a) Review the current catalog of FIPT approved CLMs and assess them against a set of KLP requirements	*(Open Action Item): DACM to provide Army guidance letter on 80 Hours CLP that includes the Supervisors requirement to ensure employees complete same.*
b) Recommend which existing CLMs are appropriate for KLP professional development	SOSE provided SEI paper that recommends Software continuous learning modules for systems engineers SOSE provided link to SERC on the CDG Program.
c) Recommend additions to the CLM catalog which address unmet KLP professional development needs	Initial draft assessments of the Engineering Level I/II/III Core Stds and Core+ Development Guides and demonstrated competency requirements for Engineering KLPs have been completed. Associated recommendations for improvements are also complete. Draft recommendations will be published in the October Interim Report.

Figure 7: RT-121 Research Dashboard

SUBTASK 1

Summary descriptions of the Career Acquisition Management Portal (CAMP)/Career Acquisition Personnel and Position Management System (CAPPMIS) were provided by DACM and ASA (ALT) representatives.   Figure 8 depicts the framework for CAMP discussions that served as the basis for an understanding of current acquisition career management information systems.
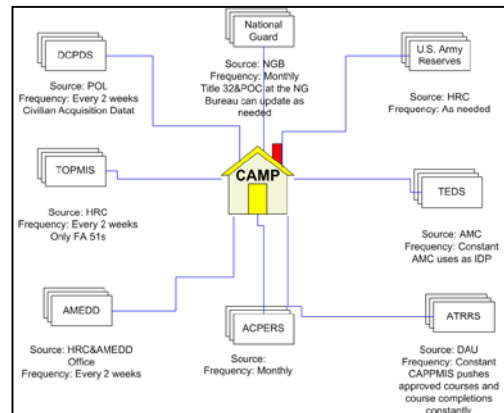
Figure 8: CAMP Portal Network

STRENGTHS

Completeness: Based on discussions with the DACM and ASA (ALT), it was concluded that CAMP electronically serves to provide a broad electronic gateway for many career development and certification data as well as career education, training, and experience opportunities. Further, CAMP provides an effective interface for aggregating and consolidating data from multiple personnel databases and making it available to both individuals and their supervisors.

Transparent Transactions: CAMP electronically enables remote and timely individual and organizational education, training, and experience transactions to support broad elements of career planning. CAMP also provides a convenient means for acquisition personnel to maintain their Acquisition Career Record Brief (ACRB) and prepare a corresponding Individual Development Plan (IDP).

LIMITATIONS

Highly Transactional: The strengths of CAMP's completeness and transparency, however, may overwhelm the Individual, Organization, or Enterprise with transaction opportunities that may serve to impede transformational career management objectives such as aligning individual training and experience for future acquisition needs. The transactional nature of CAMP may also overshadow a complete understanding and/or existence of the underlying strategies behind the required education, training, or experience elements. Career development **guidance**, therefore, may be left to the individual and become decentralized without benefit from the visibility and wisdom of the enterprise or organization.

Multi-Source Dependence: Further, a decentralized career development culture may result in variations in the selection of education, training, and/or experience with potentially poor alignment with strategic needs. The resulting 'workforce diversity' may arguably be a positive Enterprise result, however, 'inconsistent development emphasis' may have adverse effects on workforce mobility and succession planning.

Facilitation: CAMP facilitates the "how" of preparing an IDP, it does not address the "why" as it allows personnel to record and implement decisions made offline based on criteria that are not specified within CAPPMIS.

Competency Breadth: KLP competencies are specified in terms of what a candidate has done but not how well they have done 'it' or whether they are able to develop and lead others in doing 'it'. Additionally, Competencies are defined at a detailed level appropriate for expert practitioners rather than at the holistic level required of technical leaders. Further, current specified competencies do not address the ability to reframe a problem, make strategic decisions, connect disparate topics, build and develop individuals and teams.

DISCUSSION

FUNCTIONALITY

The current transactional 'toolset' provides the functionality for enabling the Individual, Organization, or Enterprise to concentrate on career development guidance processes – an element of a 'Productive Link'.

PRODUCTIVE LINK

'Productive Career Development information Network Links' should leverage the transactional capability of an existing information network to enable value-added career development goals agreed to by the engineering workforce ecosystem comprised of Individuals, Organizations, and Enterprises. 'Value-added' goals, for example, might include quality and timely recruiting, satisfactory workforce retention, accelerated professional technical and leadership development, on-time DAWIA certification, and adequate pools of qualified KLP candidates. The workforce ecosystem should also collectively arrive at the agreed-to value-added goals to ensure coherence of time and context. A 'productive' link therefore, should provide measurements of the agreed-to goals suitable for enterprise adaptations.

RECOMMENDATIONS

Decision Support System: It is recommended that ASA (ALT) SOSE&I consider developing a decision support system to guide acquisition personnel in deciding what courses to take and what assignments to pursue.

Competencies in Depth: It is further recommended that ASA (ALT) SOSE&I consider reviewing and then revising the KLP competencies to a) raise their level from the ability to <u>do</u> to the ability to <u>develop and lead</u>, and b) relegate capabilities more appropriate for expert practitioner to Level III.   A potential review process would be the conduct of a workshop with representatives from Army acquisition career field (users), organizations (e.g. ASA (ALT) SOSE&I, DACM), and field activities (e.g. RDECOM, PEOs) and 'test' the existing CAMP-based information network from the ecosystem's 'value-added' perspective. Sample workshop questions are noted in Figure 9. At the conclusion of the workshop, develop recommendations to improve the productivity of the career development links.

- Sample Workshop Questions
    - User Perspective:
        - Do I understand what I need to do to a) get certified?, b) achieve personal goals?
        - Can I easily request and get feedback on my IDP specifics?
        - Are my documented education, training, experience, and desires accessed and understood by all the necessary stakeholders (Organizations & Enterprises) in my IDP?
        - What are the additional SWOTs from a user perspective?
    - Organizational Perspective:
        - Can the organization's technical workforce be accurately accessed for strengths, weaknesses, opportunity, & threats?
        - Are the organization's technical workforce needs accurately presented for all stakeholders and can the needs be easily acted upon by the applicable workforce hiring & retention infrastructures?
        - What are the additional SWOTs from an organizational perspective?
    - Operational or Field Activity Perspective
        - Are the program's needs accurately presented for all stakeholders and can the needs be easily acted upon by the applicable workforce hiring infrastructures?
        - What are the additional SWOTs from an operational perspective?

Figure 9: Sample Productive Link Workshop Questions

SUBTASK 2

Summary descriptions of the Senior Enterprise Talent Management (SETM) program were provided by the Army and reviewed.

STRENGTHS

The SETM program offers GS-14/15 personnel opportunities to broaden their skills and prepare themselves for greater challenges through short-term or longer-term rotational assignment.

LIMITATIONS

Rotational assignments appear to be focused on the position to be filled during the assignment, not on the competencies to be demonstrated or the value to be created.

DISCUSSION

Desired or expected outcomes of any rotational assignment should be debated and described in terms of demonstrated accomplishments or capabilities. As such, the accomplishments should not only be tangible and measureable but representative of the expected technical and leadership capabilities of the individual's role and responsibilities. The expected capabilities within the context, role, and assigned responsibility of the individual during both a rotational assignment as well as their current field assignment can be referred to as personal value propositions – the 'independent variable' for career development. Value propositions are explicit capabilities to be leveraged and honed for future acquisition engineering tasks and leadership.

RECOMMENDATIONS

Rotational Programs: Develop and implement a contracting process for rotational assignments that a) explicitly states the measurable outcomes to be produced prior to an assignment and b) systematically assesses whether or not they have been achieved at the end of the assignment.

SUBTASK 3

Summary descriptions of the Army Mentorship[5] program were provided by the Army and reviewed.

STRENGTHS

The Army Mentorship Program (AMP) appears to be an excellent program for establishing and sustaining voluntary, developmental relationships between a person of greater experience and one of lesser experience.

LIMITATIONS

Despite being in existence for nearly a decade, only 13% of the civilian workforce recognizes that they have had help from a formal or informal mentor in planning their career paths[6]. Mentoring seems to be treated as an end in itself, not as one potentially useful component of a comprehensive program for developing people. The fact that the Army Mentoring Program is positioned on the Army website as a page under MyArmyBenefits, suggests that mentoring is considered a benefit rather than a strategic mechanism for engaging more experienced people in the development of less experienced people who may be outside of their direct command.

DISCUSSION

Investigating ways of improving participation, and ultimately career development value, in any professional development program, such as mentorship initiatives by way of incentives, is indicative of the program's viewed utility and cultural acceptance within the context of the specific technical domain.

A culturally accepted 'utility' of a uniformed military mentorship model, for example, might be that of rapidly and consistently developing operational leaders who can a) rapidly assess and respond with action under fire, b) instantaneously assume higher leadership responsibility in a field of operations, and c) align their professional path to prepare for the highest level of command. Further, the aggregate assumption of a uniformed mentorship model for example might be that the individual has or will have achieved the required 'technical' competencies to operate weapons systems, conduct operations, and develop tactics independent of a mentoring program. The utility of the uniformed mentorship model, therefore, might be predominantly focused on an individual's operational leadership that is integral to fulfilling combat operation strategy and an enabler for a superior fighting force – examples of uniformed military organizational and enterprise value propositions.

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[5] Army Mentorship PPT presentation
[6] ACCD Dashboard of 30 September 2013

Mentoring utility for a civilian acquisition engineering workforce might have comparable leadership elements with respect to awareness and action but the accepted cultural demands with respect to aspirations for command and higher levels of responsibility might not have analogous applicability due to the dominant technical demands and desires of acquisition engineering. A willingness to accept broader leadership responsibilities may be viewed by some technical professionals as a departure from a more desired context of science and engineering. Nonetheless, technical contextual demands require, for example, a full understanding of technical principles, an ability to oversee design, test, and delivery of complex systems, and an ability to lead teams and enterprises during the course of emerging technical, strategic, and business dynamics. The required utility of a civilian acquisition engineering mentorship model, therefore, might be predominantly focused on <u>technical leadership</u> that is integral to fulfilling system requirements and an enabler for a superior acquisition workforce – examples of engineering organizational and enterprise value propositions. Further, engineering and technology domains that might range, for example, horizontally from rotorcraft to armored vehicles and vertically from sensors to command and control serve to not only distinguish the technical demands of design, development, and test but may result in process cultures that reflect unique engineering organization and enterprise behaviors. The uniformed military might also have cultural variations amongst infantry, armor, artillery, and air mobility domains for example but the common and accepted individual career objectives of attaining the highest levels of command might serve to normalize negative impacts of those variations within the space of mentorship initiatives.

Having to incentivize mentorship programs may also result in an undesired reliance on the organization or enterprise vice the individual to 'own' the initiative. Placing the burden of responsibility onto the individual careerist for thinking through and promoting visible utility of their personal mentorship actions can <u>engage</u> the individual on a leadership level as opposed to an individual contributor level. 'Growing by doing' as a professional development experience in it of itself might also be a remedy for improving the cultural acceptance of mentorship.

RECOMMENDATIONS

Professional development is integral for organizations and enterprises to leverage their most valued resource – people. Mentorship, a personal interaction amongst individuals, can therefore be viewed as a tactical or 'field' element of professional development. Further, it can 'realize', in the best of cases, the professional development strategy of an enterprise and can also be viewed as the 'field' complement to classroom education or training. There are additional enterprise benefits of successful mentorship activities to include organizational cohesion through the personalization of an organization or team, personnel recruiting and retention, competency and knowledge management, and establishing active forums for enhancing positive organizational cultures.   To that end, the following are recommendations for consideration.

KLP Requirements: KLP candidates should be required to independently develop and lead mentoring approaches to expose them to the complexities of articulating the value and objective of such professional development programs. In addition, "mentoring people outside their chain

of command" should be included in the definition of Executive Leadership listed among the cross-functional competencies required of KLP candidates in order to foster a sense of ownership for the success of the entire enterprise, not just of the candidate's part.

Level II Requirements: As development and growth of individuals and teams are enablers for a superior acquisition workforce, engineering acquisition career field development plans should subordinate mentoring as a required Level II and above demonstration element.

SUBTASK 4

The Subtask 4 research proceeded with the objective of achieving a broad perspective of how specific training and experience requirements were developed. Figure 10 summarizes the sequence of reference materials described in the following discussion.

Figure 11	• Civilian Steps to Planning Your Acquisition Career[6]
Figure 12	• Four Elements of Army Acquisition Civilian Leadership Development Plan[6]
Figure 13	• Engineering Level I/II/III & KLP Requirements (Ref: iCatolog.dau.mil)
Figure 14	• Engineering Level I/II/III Core Standards & Core Plus Development Guides (Ref: iCatalog.dau.mil)
Figure 15	• Required & Preferred Engineering KLP Requirements
Figure 16	• Demonstrated KLP Competencies
Figure 17	• KLP Technical Management Requirements
Figure 18	• KLP Business Management Requirements
Figure 19	• KLP Currency Requirements

Figure 10: Subtask 4 Document Review

As noted in Figure 11, there are six steps plus three additional elements that comprise the current 'Civilian Steps to Planning your Acquisition Career'. Further, note the three additional elements after Step Six; Continuing Learning Points (CLP), Career-Broadening Activities, and the Army Acquisition Civilian Leadership Development Plan.

Step One – Prepare an Acquisition Career Record Brief (ACRB):

Step Two – Review Certification Requirements:

Step Three – Prepare an Individual Development Plan (IDP):

Step Four – Submit your IDP for Approval:

Step Five – Apply for Defense Acquisition University (DAU) Training:

Step Six – Apply for Certification:

Required throughout employees' Career – Continuous Learning Points (CLPs):

Career-Broadening Activities:

Army Acquisition Civilian Leadership Development Plan:

Figure 11: Civilian Steps to Planning Your Acquisition Career[6]

The third of the three noted elements, The Army Acquisition Civilian Leadership Development Plan, is illustrated in Figure 12. Further, the Leadership Development plan is comprised of four components: a) Higher Education, b) Leadership Training, c) Civilian Education System Leadership Courses, and, d) Defense Acquisition Workforce Improvement Act (DAWIA) Training.
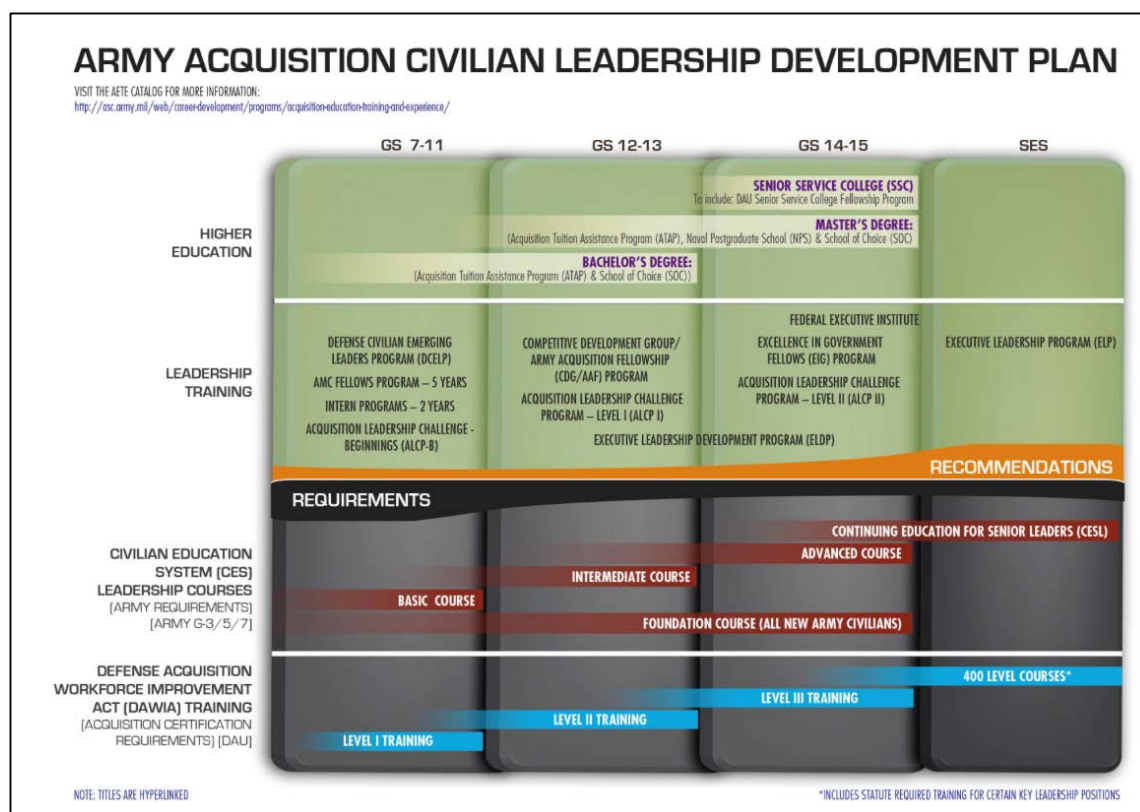
Figure 12: Four Elements of Army Acquisition Civilian Leadership Development Plan[6]

Among other objectives, DAWIA Training[7] is aimed at preparing individuals for obtaining Engineering Level I/II/II and KLP certifications. Figure 13 illustrates the four groups of training, education, and experience requirements for engineers in the acquisition career field.

1. **Level I/II/III Certification Required** Training, Education, & Experience
2. **Level I/II/III Core Plus Recommended** Training, Education, & Experience
3. **KLP Required & Preferred** Acquisition Training, Education, & Experience, and,
4. **KLP Demonstrated** Competency, Technical Management, & Business Management

Note that within the four categories, there is an implied variance on the demand side of training, education, and experience made visible through the use of the adjectives 'Required, Recommended, Preferred, and Demonstrated'.

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[7] iCatalog.dau.mil
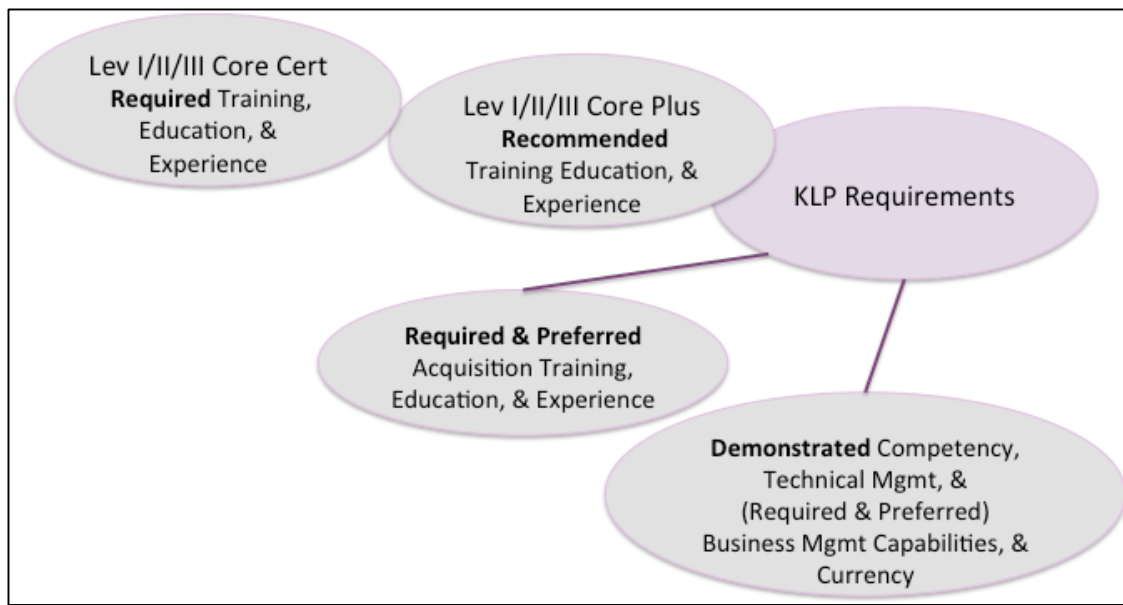
Figure 13: Engineering Level I/II/III & KLP Requirements (Ref: iCatalog.dau.mil)

Figure 14 summarizes the Level I/II/III education, training, and experience requirements described as Level I/II/III Core Standards and Core Plus Development Guides.

(Professional) Activities	Lev I *Monitor*	Lev II *Monitor & Oversee*	Lev III *Lead & Manage*
Required Core Certification Stds			
Training Courses			
Acquisition	1	2	0
Functional	4	4	4
(Formal) Education	Bacc/Graduate in field such as engineering, physics, chemistry, biology, math, OR, Eng Mgmt, or Comp Sci	Bacc/Graduate in field such as engineering, physics, chemistry, biology, math, OR, Eng Mgmt, or Comp Sci	Bacc/Graduate in field such as engineering, physics, chemistry, biology, math, OR, Eng Mgmt, or Comp Sci
Experience (Yrs)	1 yr technical experience in an acquisition position. Similar experience gained from other government positions or industry is acceptable as long as it meets the above standard.	2 yrs technical experience in an acquisition position with at least 1 yr in a ENG or S&TM position. Remainder may come from IT, T&E, PQM, PM, or LCL. Similar experience gained from other government positions or industry is acceptable as long	4 yrs technical experience in an acquisition position with at least 3 yrs in a ENG or S&TM position. Remainder may come from IT, T&E, PQM, PM, or LCL Similar experience gained from other government positions or industry is acceptable as long
Recommended Core Plus Development Guides			
Training Courses	25	29	36
Acquisition	2	0	5
Business Mgmt		3	1
Other Functional-General-Research	23	26	30
(Formal) Education	None Specified	Graduate Deg	Graduate Deg
Experience (Yrs)	1+ over Cert	2+ over Cert	4+ over Cert

Figure 14: Engineering Level I/II/III Core Standards & Core Plus Development Guides (Ref: iCatalog.dau.mil)

Req'd Acquisition Trng Courses	Completed at least one DAU 400 Level Acquisition Course
	DAWIA SPRDE Level III Training Courses
(Formal) Education	None Stated
Req'd Experience (Yrs)	Eight years of experience in an acquisition billet with at least 6 years in SPRDE, and at least 3 years in a program office, or similar organization.
	Five years of supervisory or **team leading** experience.
	Demonstrated superior performance as a **Chief or Lead Systems Engineer** in a **non-MDAP** and/or demonstrated superior performance as a Chief or Lead Systems Engineer for a **major subcomponent** (e.g. Propulsion IPT in an aircraft MDAP)
	Specific, documented experience **managing technical performance risks**, developing and implementing mitigation strategies.
Preferred Acquisition Trng Courses	Leadership training via DoD or University or Industry Sources
	DAWIA IT Level II Certified (for software intensive systems)
	DAWIA PM Level III Training Courses
(Formal) Education	None Stated
Preferred Experience (Yrs)	Documented mentoring experience for Entry Level, Journeymen, and Subject Matter Expert Systems Engineers and background in developing leaders.
	Served as an IPT lead in an acquisition program in at least two phases of the Defense Acquisition System.
	Application of Rapid Prototyping principles and/or Advanced Concept Technology Demonstrations to systems acquisitions

Figure 15: Required & Preferred Engineering KLP Requirements

Competencies

Systems Engineering Leadership as demonstrated by providing **proactive technical direction & motivation** resulting in proper application of **SE processes** as defined in the Defense Acquisition Guide (DAG) and the overall success of the technical management process.

Communications as demonstrated by clearly **conveying technical and complex concepts**, verbally and in writing, to **inform and persuade** program leadership and others on specific ideas.

• Problem Solving as demonstrated by **identifying/analyzing problems using a systems approach** to evaluating information and alternative solutions including accounting for interdependencies.

• **Stakeholder Requirements Definition** as demonstrated by working with the user to establish and refine operational needs, attributes, performance parameters, and constraints and ensuring all relevant requirements and design considerations are addressed.

• Decision Analysis as demonstrated by employing procedures, methods and tools for conducting **trade studies to balance cost, schedule, performance & risk** to select a solution.

• **Technical Planning** as demonstrated by developing the program technical effort needed for the program to **meet its technical objectives within cost & schedule** constraints documented in a Systems Engineering Plan (SEP).

• Risk Management as demonstrated by identifying risk drivers, dependencies, root causes, and developing risk mitigation/consequence management strategies throughout the program total lifecycle.

• **Acquisition planning** as demonstrated by determining the appropriate **level of technical activity and resources**, including Basis of Estimates (BES), needed to achieve program objectives.

Figure 16: Demonstrated KLP Competencies

Technical Management

• **Requirements Analysis** as demonstrated by analyzing, deriving and allocating feasible and effective requirements from user capabilities/requirements.

• **Integration** as demonstrated by managing technical issues that arise during the integration processes and feedback into the design solution process for the refinement of the design.

• **Verification** as demonstrated by designing and implementing an integrated testing process to assess the system against its required system capabilities.

• **Mission Assurance** as demonstrated by applying and executing engineering processes to identify and mitigate deficiencies and vulnerabilities in design, production, test, and field support to increase confidence that the system will function as intended.

• **Reliability and Maintainability** (R&M) as demonstrated by integrating R&M design analysis and test activities within the program's systems engineering processes throughout all system life cycle phases.

• **Designing for Support** as demonstrated by recognizing the importance of successfully achieving warfighter product support and sustainment requirements in designing for long-term supportability to meet DoD Availability Key Performance Parameter (KPP) and Reliability and Operations & Support Cost Key System Attributes (KSA).

• **Technical Assessment** as demonstrated by planning and executing technical reviews (PDR and CDR at a minimum) to assess program maturity and risk to determine sufficiency to continue with technical development; developing and using metrics (i.e. TPMs, MOEs, risk, etc.) to measure technical progress, and determining/implementing corrective actions.

Figure 17: KLP Technical Management Requirements

Figure 18: KLP Business Management Requirements

Figure 19: KLP Currency Requirements

In summary, the path to the current DAWIA training begins with Career Steps expanded through three initiatives, then proceeds to a categorization of 'Required, Recommended, Preferred, and Demonstrated' education, training, and experience, and concludes with specific education, training, and experience as precursors to Level I/II/II and KLP certification.

STRENGTHS

In addition to the courses required for certification, DAU offers a large number of Core Plus courses for expanded training beyond the basic requirements at each DAWIA level. Also, KLP education, training experience and competency requirements and preferences are included in the DAU catalog, along with the DAWIA requirements for certification at each level.

LIMITATIONS

Both the required and recommended courses address individual topics or skills, not the holistic perspective required by technical leadership.

DISCUSSION

Expectations: Many 'Core Certification standards', vis a vis descriptions of professional activities and experience, are general in nature. Twenty-Five percent of Core Certification courses are acquisition related and a there is a broad range of core formal education requirements. The cumulative effect of general experience descriptions and broad range of education requirements can provide individuals and supervisors with high degrees of freedom for assignment and expectation and expand the Army portfolio of certified acquisition engineers but also may move the engineering knowledge 'center of gravity' to a position of general engineering know how.

Correlations: Correlations of (Professional) 'Activities' described as 'monitor', 'monitor & oversee', and 'lead & manage' to the desires of the technical engineering competency expectations or Value Propositions of the acquisition enterprise are not explicit. Further, guidance correlating the explicit nature of the activities to the demands of the acquisition enterprise such as domain job descriptions is not explicit.

KLP Requirements: KLP requirements are more specific when compared to the more general nature of Core and Core Plus requirements. To that end, certified Lev III personnel may lack specific credentials required to efficiently achieve KLP readiness.

Core Education: There are a relatively large number of Core Education Requirements that appear to be functionally driven as opposed to systems driven. The implied assumption is that 'superposition' of deep functional knowledge amongst the workforce will result in efficient acquisition operations in the aggregate. Further, functionally based acquisition engineering certification strategies may:

- Serve to broaden isolation of deep functional stovepipes within the engineering workforce,
- Result in a 'my world' view amongst individual contributors that can limit broader holistic thinking,
- Lead to sparse inter-function connection and a relatively small number of people who primarily through their curiosity and motivation have an 'all world' view, and,
- Acquisition leadership development through Level III becomes somewhat random, as leadership development is not explicitly managed for the good of the acquisition enterprise.

Competencies: There is a lack of depth for defining and measuring 'competencies'. Without a measured capability-based competency definition, the implication is that functional knowledge supported by general acquisition experience can adequately enable individuals to efficiently lead IPTs and/or attain KLP candidacy.

In summary, although a necessary condition for engineering Level I/II/II certification, the cumulative implication of the limitations noted above might not sufficiently support <u>timely</u> preparation for technical KLP candidacy. The resulting 'technical worlds' might also remain 'functional' and become further isolated from the broader acquisition leadership demands of the Enterprise. Further, as technical-based leadership of a broader Enterprise is a likely 'necessary' condition for successful IPT leadership and KLP candidacy, a potential end result of competency definition lapses is a less than efficient acquisition workforce.

RECOMMENDATIONS

It is recommended that:

Technical Leadership: Development and deployment of a Level I/II/III educational program for technical leaders should be considered. Program topics should include: technical leadership

value propositions; technology evolution; strategic and financial decision making in industry and government; working across a technical-business enterprise; building, developing, sustaining and leading teams; and designing and leading change.

Core Training: Consider 'leaning' the 'functional' educational requirements and loading Levels I and II with the majority of the remaining Core training requirements. Also, place more emphasis on leading systems development, integration, test, and prototype manufacturing. In this way, 'center of gravity' of the Level III training requirements would move toward a techno-business-enterprise center, as illustrated in Figure 20, and Level III Certification becomes an earlier 'vector' pointed and weighted towards KLP candidacy. This would increase the likelihood of a fifteen-year entry level-to-KLP readiness objective becomes a more realistic opportunity.
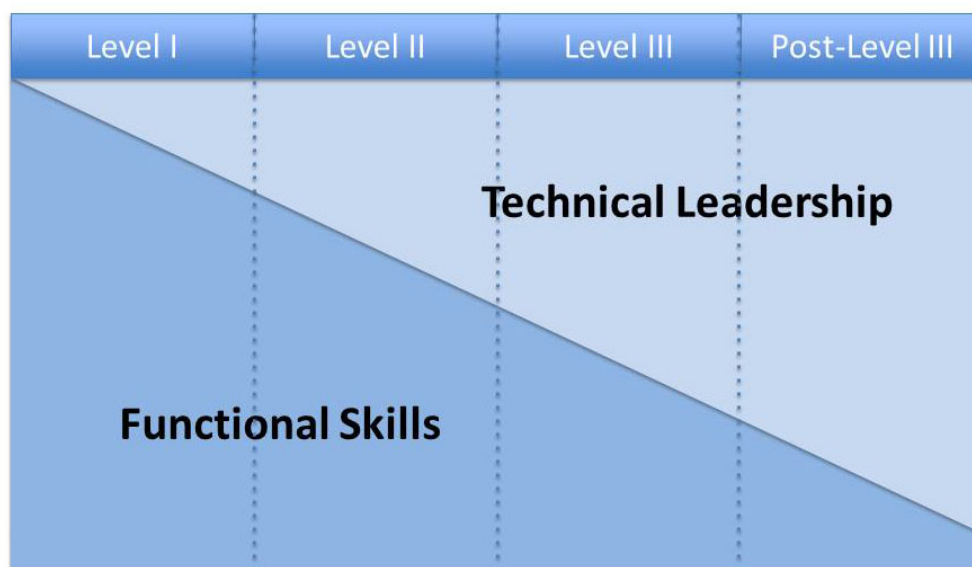
Figure 20: Techno-Business Shift of Core Training

Value Propositions: Consider referring to 'Professional Development' vice 'Career Development' to complement in-depth functional learning with a knowledge of the technology-business-enterprise as well as sensitizing individual contributors to the need for understanding and leveraging teams, groups, organizations, and enterprises. Further, consider the use of explicit expectations or 'Value Propositions' to provide context and a framework for measurable competencies in terms of actionable expectations. Figure 21 depicts how one might translate existing KLP requirements to actionable value propositions.   Figure 22 illustrates how one might conduct a working group session to iterate a set of value propositions to achieve desired organizational or enterprise alignment with desired acquisition workforce readiness outcomes.

Technical Management

- **Requirements Analysis** as demonstrated by analyzing, deriving and allocating feasible and effective requirements from user capabilities/requirements.
- **Integration** as demonstrated by managing technical issues that arise during the integration processes and feedback into the design solution process for the refinement of the design.
- **Verification** as demonstrated by designing and implementing an integrated testing process to assess the system against its required system capabilities.
- **Mission Assurance** as demonstrated by applying and executing engineering processes to identify and mitigate deficiencies and vulnerabilities in design, production, test, and field support to increase confidence that the system will function as intended.
- **Reliability and Maintainability (R&M)** as demonstrated by integrating R&M design analysis and test activities within the program's systems engineering processes throughout all system life cycle phases.
- **Designing for Support** as demonstrated by recognizing the importance of successfully achieving warfighter product support and sustainment requirements in designing for long-term supportability to meet DoD Availability Key Performance Parameter (KPP) and Reliability and Operations & Support Cost Key System Attributes (KSA).
- **Technical Assessment** as demonstrated by planning and executing technical reviews (PDR and CDR at a minimum) to assess program maturity and risk to determine sufficiency to continue with technical development; developing and using metrics (i.e. TPMs, MOEs, risk, etc.) to measure technical progress, and determining/implementing corrective actions.

Technical Management

- **Requirements Analysis** as demonstrated by analyzing, deriving and allocating feasible and effective requirements from user capabilities/requirements.
- **Integration** as demonstrated by managing technical issues that arise during the integration processes and feedback into the design solution process for the refinement of the design.
- **Verification** as demonstrated by designing and implementing an integrated testing process to assess the system against its required system capabilities.
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- **Reliability and Maintainability (R&M)** as demonstrated by integrating R&M design analysis and test activities within the program's systems engineering processes throughout all system life cycle phases.
- **Designing for Support** as demonstrated by recognizing the importance of successfully achieving warfighter product support and sustainment requirements in designing for long-term supportability to meet DoD Availability Key Performance Parameter (KPP) and Reliability and Operations & Support Cost Key System Attributes (KSA).
- **Technical Assessment** as demonstrated by planning and executing technical reviews (PDR and CDR at a minimum) to assess program maturity and risk to determine sufficiency to continue with technical development; developing and using metrics (i.e. TPMs, MOEs, risk, etc.) to measure technical progress, and determining/implementing corrective actions.

Business Mgmt

REQUIRED o **Technical Basis for Cost** as demonstrated by documenting program phase requirements and the current system overview in the Cost Analysis Requirements Description (CARD), or equivalent.
o **Acquisition planning** as demonstrated by determining the appropriate level of technical activity and resources, including Basis of Estimates (BES), needed to achieve program objectives.
o Demonstrated superior **management of contractor performance** that led to successful acquisition program execution including the utilization of technical performance measures as leading indicators as applied to such as Earned Value Management (EVM). This includes the review of the contractor's variance analysis for indications of root causes associated with the contractor's engineering management systems.
o Demonstrated experience in developing **technical contract language and artifacts** to support successful and comprehensive source selection and contract award.
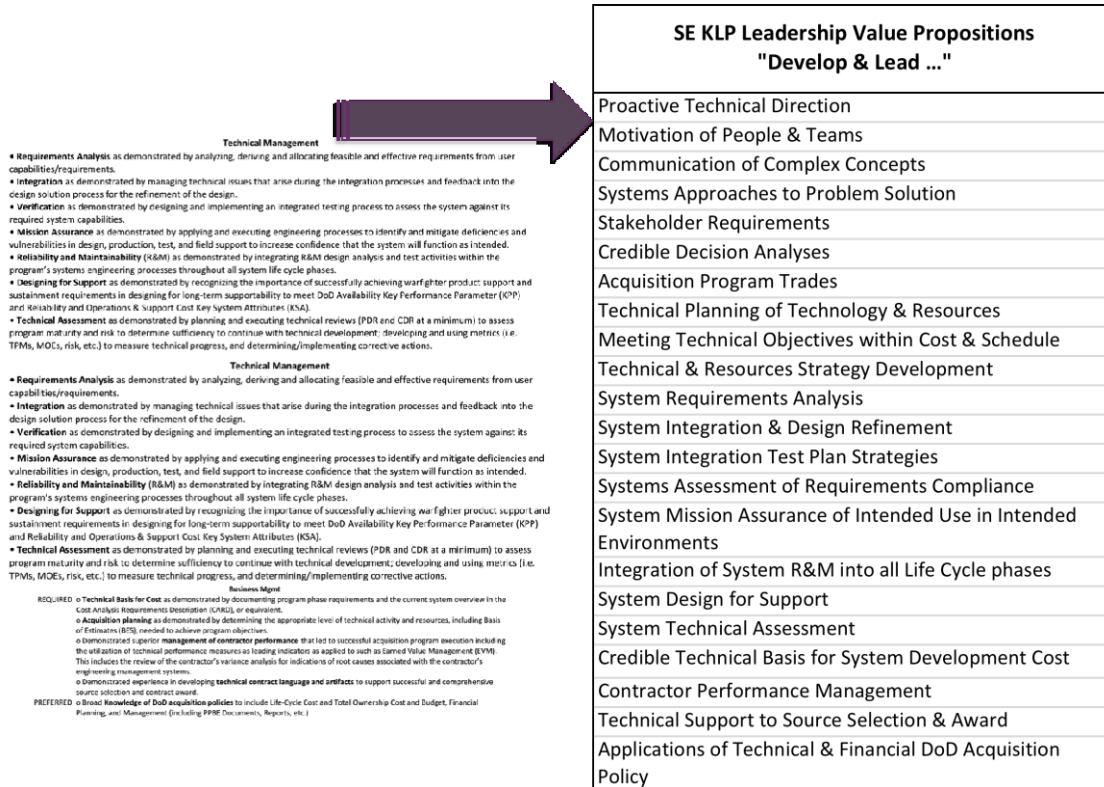PREFERRED o Broad **Knowledge of DoD acquisition policies** to include Life-Cycle Cost and Total Ownership Cost and Budget, Financial Planning, and Management (including PPBE Documents, Reports, etc.)

SE KLP Leadership Value Propositions "Develop & Lead …"
Proactive Technical Direction
Motivation of People & Teams
Communication of Complex Concepts
Systems Approaches to Problem Solution
Stakeholder Requirements
Credible Decision Analyses
Acquisition Program Trades
Technical Planning of Technology & Resources
Meeting Technical Objectives within Cost & Schedule
Technical & Resources Strategy Development
System Requirements Analysis
System Integration & Design Refinement
System Integration Test Plan Strategies
Systems Assessment of Requirements Compliance
System Mission Assurance of Intended Use in Intended Environments
Integration of System R&M into all Life Cycle phases
System Design for Support
System Technical Assessment
Credible Technical Basis for System Development Cost
Contractor Performance Management
Technical Support to Source Selection & Award
Applications of Technical & Financial DoD Acquisition Policy

Figure 21: Translating KLP Requirements to Value Propositions

SE KLP Leadership Value Propositions "Develop & Lead …"	Least Important (Bottom 5)	Most Important (Top 5)	Move to Lev III Rqmt	Primary (P) Path for KLP Career Development			USD Memo Linkage
				Training	Education	Experience	
Proactive Technical Direction							
Motivation of People & Teams							
Communication of Complex Concepts							
Systems Approaches to Problem Solution							
Stakeholder Requirements							
Credible Decision Analyses							
Acquisition Program Trades							
Technical Planning of Technology & Resources							
Meeting Technical Objectives within Cost & Schedule							
Technical & Resources Strategy Development							
System Requirements Analysis							
System Integration & Design Refinement							
System Integration Test Plan Strategies							
Systems Assessment of Requirements Compliance							
System Mission Assurance of Intended Use in Intended Environments							
Integration of System R&M into all Life Cycle phases							
System Design for Support							
System Technical Assessment							
Credible Technical Basis for System Development Cost							
Contractor Performance Management							
Technical Support to Source Selection & Award							
Applications of Technical & Financial DoD Acquisition Policy							
Missing Value Proposition 1							
Missing Value Proposition 2							
…							

Figure 22: KLP Value Proposition Worksheet

SUMMARY RECOMMENDATIONS

As described above, the RT-121 research plan 'reduced' the task to four subtasks. As subsequent discovery and observations began to take shape, it became increasingly clear that the findings and recommendations were, on balance, not stand alone 'vectors,' due to the overlap, and in some cases, coupling of the subtask context. To that end, a reflective review of the subtask level recommendations described in Sections 3 through 6 above was conducted to synthesize a macro-holistic set of recommendations that encompassed the significant recommendations of the research team. Figure 23 depicts the synthesis that resulted in three context-similar clusters that were subsequently entitled Integrated Professional Development Planning & Measurement, Level I/II/III Progression Continuity, and Value Propositions.

Decision Support System: It is recommended that ASA (ALT) SOSE&I consider developing a decision support system to guide acquisition personnel in deciding what courses to take and what assignments to pursue.	**Integrated Professional Development Planning & Measurement**
Competencies in Depth: It is further recommended that ASA (ALT) SOSE&I consider reviewing and revising the KLP competencies to a) raise their level from the ability to do to the ability to develop and lead, and b) relegate capabilities more appropriate for expert practitioner to Level III. A potential review process would be the conduct of a workshop with representatives from Army acquisition career filed (users), organizations (e.g. ASA (ALT) SOSE&I, DACM), and field activities (e.g. RDECOM, PEOs) and 'test' the existing CAMP-based information network from the ecosystem's 'value-added' perspective. Sample workshop questions are noted in Figure 9. At the conclusion of the workshop, develop recommendations to improve the productivity of the career development links.	**Level I/II/III/KLP Progression Continuity:**
Rotational Programs: Implement a contracting process for rotational assignments that explicitly states the measurable outcomes to be produced prior to an assignment and systematically assesses whether or not they have been achieved at the end.	**Level I/II/III/KLP Progression Continuity:**
KLP Requirements: KLP candidates should be required to independently develop and lead mentoring approaches to expose them to the complexities of articulating the value and objective of such professional development programs.	**Level I/II/III/KLP Progression Continuity:**
Level II Requirements: As development and growth of individuals and teams are enablers for a superior acquisition workforce, engineering acquisition career field development plans should subordinate mentoring as a required Level II and above demonstration element.	**Value Propositions**
Technical Leadership: A development and deployment of a Level I/II/III educational program for technical leaders should be considered. Program topics would include: leadership value propositions; technology evolution; strategic and financial decision making in industry and government; working across an enterprise; building, developing, sustaining and leading teams; and designing and leading	**Value Propositions**
Core Training: Consider a 'leaning' of the 'functional' educational requirements and loading the Level I and II with the majority of the Core training requirements. In this way, the Level III training requirements 'center of gravity' moves toward a techno-business-enterprise center, and Level III Certifications become an earlier 'vector' pointed and weighted towards KLP candidacy. In addition, the likelihood of fifteen year-to-KLP objective becomes a more realistic opportunity.	**Value Propositions**
Value Propositions: Consider referring to 'Professional Development' vice 'Career Development' to complement in-depth functional learning with a knowledge of the technology-business-enterprise as well as sensitizing individual contributors to the need for understanding and leveraging teams, groups, organizations, and enterprises. Further, consider the use of explicit expectations or 'Value Propositions' to provide context and measurable competencies in terms of actionable expectations.	**Value Propositions**

Figure 23: Subtask Recommendations Context Clusters

Figure 24 represents the three synthesized clusters that represent the major engineering professional career development model recommendations resulting from the RT-121 research. The details of these recommendations are described below.

Value Propositions as Primary Acquisition Professional Development Drivers: Consider a cultural shift to the use of value propositions as certification criteria as a more explicit way of demonstrating individual capabilities for the career development enterprise.

Level I/II/III/KLP Progression Continuity: Improve engineering certification processes to enhance the continuity of Level III-to-KLP transitions.

Integrated Professional Development Planning & Measurement: Expand the career guidance utility of the current career management information system (e.g. CAMP) through the use of a CDS Decision Support System.

Figure 24: RT-121 Summary Recommendation Categories

Many dimensions of a Professional Development Model have been discussed and presented in the preceding. The emphasis of the summary research recommendations were a) grounded in a shift to the use of value propositions as the independent variables for professional development and b) guided by a continuous reflection on how one might enhance integration of a professional development model and resulting individual plan. To that end, Figure 25 is offered as a way to frame or synthesize an integrated professional development plan. Proposed as a living document, the integrated plan can be tailored for individual needs and objectives, can serve as scorecard for goals and progress, and can additionally be customized for acquisition effectiveness through the convergence of the specific value propositions for individuals, organizations, or enterprises.
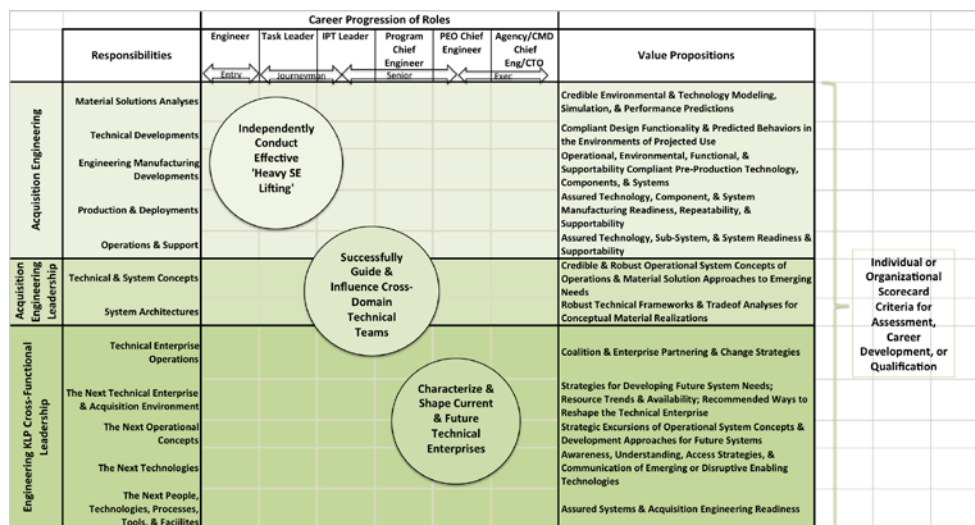

Figure 25: Responsibility-Progression-Value Proposition Framework